Psychosocial functioning in toddlers with moderate hearing loss : the importance of caregivers

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CHAPTER 2

Concern for Others: A Study on Empathy in Toddlers with Moderate Hearing Loss

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ABSTRACT

Objectives
The purpose of this study was to examine empathy levels in toddlers with moderate hearing loss (MHL) compared to toddlers without hearing loss (NH), and to explore the relation between language ability and empathy.

Design
A total of 23 toddlers with MHL and 21 toddlers without hearing loss participated in the study. Parent report (ITSEA) and observation measures were used to rate the toddlers' levels of empathy. Both the ability to feel the emotions of others and the ability to understand the intentions of others were observed.

Results
The results showed that the toddlers with MHL and with NH were similar affected by the feelings of others, however, they the toddlers with MHL lagged behind their peers with NH in their understanding of others intentions. Language ability was unrelated to empathy levels in both groups of toddlers.

Conclusions
Toddlers with MHL seem to be at risk for problems in their empathy development. Although they are aware of the emotions of others, the development of more complex skills needed for an adequate empathic response is delayed in comparison with their hearing peers.

INTRODUCTION

Understanding and feeling what another is feeling, how do children achieve this capacity? This skill, known as empathy, is crucial for bonding with others, and for building close and meaningful relationships (Jolliffe & Farrington, 2006). The absence of an empathic reaction when a child's best friend is in distress can seriously harm their friendship. The question is whether all children develop this skill to their full potential. A group of children that is more at risk for social-emotional difficulties are children with hearing loss (HL) (Stevenson et al., 2015). The few studies among children with HL that have been conducted to date do not show that these children have difficulties in being affected by emotional arousal in another person (Ketelaar, Rieffe, Wiefferink, & Frijns, 2013; Netten et al., 2015). However, a recent study supports the notion that within the domain of HL, the degree of hearing loss can have a differential effect on children's social and emotional development (Theunissen et al., 2015). Children with a lesser degree of HL performed less well on indices of social functioning than their peers with more severe degrees of hearing loss (Hintermair, 2007; Theunissen et al., 2015). Possibly, this also extends to empathic functioning.

To date, research regarding empathy in a well-defined group of young children with moderate hearing loss (MHL) is lacking. Therefore, the main aim of the present study was to explore the level of empathy in young children with MHL (here defined as a hearing loss between 40-70 dB in the better ear) as compared to their peers with NH.

Children with Moderate Hearing Loss: The 'Forgotten' Children?

To date, most research concerning children with HL has focused on children with severe and profound HL (>70 dB HL), or on children with differing degrees of HL (30 – 110 dB HL). Consequently, a gap exists in our knowledge regarding the development of children with MHL (Eisenberg, 2007), which explains why Julia Davis called these children 'our forgotten children'. There are a number of recent studies on the current generation of children with MHL, which consistently show that these children are at risk for language delays despite early intervention and use of hearing aids (Ambrose et al., 2014; Koehlinger, Van Horne, & Moeller, 2013; McCreery et al., 2015; Tomblin et al., 2015).

Studies on the social-emotional development of early-identified children with MHL are even more sparse and the results of these studies are mixed. One recent study found no difficulties in social-emotional functioning, as reported by parents, in 18-month-old children with mild to severe HL (Stika et al., 2015). In contrast, studies among older children (older than 4 years of age) with differing degrees of HL (including MHL), conducted before the implementation of the neonatal hearing screening programs showed that these children had more social-emotional difficulties than children without HL (NH) (Dammeyer, 2010; Davis, Elfenbein, Schum, & Bentler, 1986; Hintermair, 2006; Kouwenberg, Rieffe, Theunissen, & de Rooij, 2012; Theunissen et al., 2015). Theunissen

et al. (2015) even found that preadolescents with less severe degrees of HL had higher levels of psychopathological symptoms than their peers with more severe degrees of HL.

There are several possible explanations for the reported disadvantage in children with MHL relative to children with more severe degrees of HL. Some researchers have suggested that the social needs of children with MHL are often underestimated (Mary Pat Moeller, 2007; Pipp-Siegel, Sedey, & Yoshinaga-Itano, 2002). Compared to deaf children, children with MHL speak quite well and are more reactive to sound. However, it is quite difficult for children with MHL to fully understand spoken conversations between others (Stelmachowicz, Pittman, Hoover, & Lewis, 2001). Despite their hearing aids, children with MHL still have difficulties understanding speech in noise (McCreery et al., 2015; Stelmachowicz, Pittman, Hoover, Lewis, & Moeller, 2004). These difficulties in fully understanding what others are saying may frustrate children with MHL, which in turn could restrict them in their daily social interactions. For example, it will be more difficult for children with MHL to join free play situations in noisy environments. They cannot overhear all conversations occurring around them and consequently will miss information that others are privy to. They are more likely to miss how other children argue and make up with each other. Being able to fully understand and experience these social situations is beneficial for children's social-emotional development.

Language is needed to make other people's motives, feelings and perspectives accessible, which helps to understand why they behave in a certain way and makes it easier to anticipate or appropriately respond to these behaviors. Although the developmental perspectives of children with MHL have improved with the implementation of the neonatal hearing screening and early intervention programs, these children are still at risk for language difficulties (Tomblin et al., 2015) that might restrict them in their interactions with others. Their language outcomes depend on various variables like the degree of hearing loss, early age of hearing aid fitting, the consistently daily use of hearing aids, and rich maternal language input (Moeller et al., 2015). When all of these factors are optimized, children with MHL could achieve language ability scores in the average range.

In addition, parents and professionals may not be fully aware of the impact that the MHL has on the child's functioning and development. Parents might be less aware that children with MHL miss important opportunities for incidental social-emotional learning. This possible lack of awareness may mean that parents of children with MHL do not explicitly pay attention to feelings and thoughts (of self and others) when interacting with their child. In sum, children with MHL probably have fewer opportunities for social learning than children with NH and their social environment may underestimate this disadvantage, both of which can seriously affect the social-emotional development of children with MHL (Rieffe, Netten, Broekhof, & Veiga, 2015).

Affective Empathy

Empathy is an emotion that is triggered by observing an emotion in someone else. The capacity to experience and express empathy is an important factor in the development of social competence (Rieffe & Camodeca, 2016; Roth-Hanania, Davidov, & Zahn-Waxler, 2011). Children who show higher levels of empathy are more liked by their peers and are seen as more socially competent (Eisenberg, Spinrad, & Sadovsky, 2006). According to Hoffman's theory of empathy development, human beings are biologically hardwired to feel the distress of others (Hoffman, 1990). For example, the crying of a baby also triggers other babies to cry. Emotional reactions in response to other people's emotions - feeling what the other person is feeling - are referred to as 'affective empathy' (Baron-Cohen & Wheelwright, 2004). This feeling of others' emotions triggers prosocial behavior, for example helping or comforting the other person.

Two recent studies examined affective empathic behavior in children with HL, using a set of observation tasks and questionnaires (Ketelaar et al., 2013; Netten et al., 2015). In both studies, children were faced with "live" emotions of the experimenters. The experimenters acted out emotions in three different situations and they observed the children's reaction to these emotions. They observed to what extent the children had attention for the situation and/or the experimenter and if they showed prosocial responses to the experimenter. The situations in which the experimenter acted out the emotions differed by age of the children. With younger children, the experimenter for example hurt her finger and acted out being sad. In an older age group, the experimenter acted out that she was disappointed because her friend had cancelled an appointment. Although one study focused on young deaf children with a cochlear implant (CI) (Ketelaar et al., 2013), and the other study on preadolescents with different degrees of HL (Netten et al., 2015), both studies found similar levels of affective empathy in children with and without HL.

The question is to what extent these outcomes might also apply to children with MHL, the focus of the current study. Given Hoffman's (1990) presumption that the capacity for affective empathy is innate, there is no obvious reason to assume that children with MHL will differ from their peers with NH or from their peers with more severe forms of HL.

Cognitive Empathy

Next to the ability to feel what the other person is feeling, it is important to understand why a person is feeling that way. Understanding the reason behind your best friend's anger is a great help when you want to support him or her. It facilitates selection of the most suitable response from a variety of possible reactions. The ability to take the perspective of the other person - knowing and understanding what the other person is feeling - is called 'cognitive empathy', (Baron-Cohen & Wheelwright, 2004).

Recent studies on cognitive empathy have revealed that throughout childhood, children with HL lag behind their peers with NH in this respect (Netten et al., 2015; Peterson, 2015).

In the study by Peterson (2015), teachers reported that deaf children were less capable of understanding the feelings of others than children with NH. Netten et al. (2015) showed that preadolescents with different degrees of HL reported lower levels of cognitive empathy than their peers with NH.

For the development of cognitive empathy, a Theory of Mind (ToM) is essential. ToM refers to the ability to understand that others have mental states (intentions, desires, and beliefs) that may differ from one's own. ToM capacities develop during the preschool years. Various studies have shown that the development of ToM is delayed in deaf children with hearing parents (Ketelaar, Rieffe, Wiefferink & Frijns, 2012; Moeller & Schick, 2006; Peterson & Siegal, 1995, 2000; Peterson, Wellman, & Liu, 2005). However, the development of ToM in deaf children with deaf parents seems to be on par with hearing peers (Peterson & Siegal, 1999; Peterson, Wellman, & Liu, 2005; Schick, Villiers, Villiers, & Hoffmeister, 2007). Most studies used false-belief understanding to examine deaf children's ToM. In a study by Moeller (2013), false belief understanding was examined in children with MHL. In this study, only 36% of five-year-olds with MHL passed a false belief task, compared to 84% of the hearing children. So besides deaf children, children with MHL also show a delay in their ToM development.

Before the age of five, children's ToM development is marked by the so-called precursors. One of these precursors is the ability to appreciate other people's intentions (Tomasello, Carpenter, Call, Behne, & Moll, 2005). Children who are able to acknowledge others' intentions are increasingly able to understand that people's actions are guided by their intentions. Ketelaar and colleagues (2012) examined intention understanding in young deaf children with CI and hearing peers by presenting them with three tasks, which all involved a final goal that the experimenter failed to achieve. Children had to accomplish the goal in order to show they had understood the experimenter's intention. The outcomes showed that children with CI and children with NH performed equally well in finishing the action that was intended but not completed by the experimenter.

Joint attention, or the ability to share attention with a social partner for an object or event, is one of the first types of intention understanding to be observed in young infants (Tomasello, Carpenter, Call, Behne, & Moll, 2005). Within the joint attention framework, we can distinguish between imperative and declarative joint attention (Colonessi, Rieffe, Koops, & Perucchini et al., 2008). Imperative joint attention refers to the ability to understand that another person attracts one's attention to request for an object, whereas declarative joint attention refers to the ability to understand that another person attracts one's attention to share an experience and communicate about it. Young deaf children with hearing parents consistently show lower levels of joint attention than hearing peers (Cejas, Barker, Quittner, & Niparko, 2014; Prezbindowski, Adamson, & Lederberg, 1998; Tasker, Nowakowski, & Schmidt, 2010), with the exception of deaf children with CI (Ketelaar et al., 2012; Tasker, Nowakowski, & Schmidt, 2010) and deaf children with deaf

parents (Spencer et al., 2000; Gale & Schick, 2009). Peterson and Siegal (1995, 2000) have suggested that the lack of access to conversations causes delays in the development of ToM. When deaf children have sufficient access to conversations, for example as a result of receiving a cochlear implant or because they grew up with deaf parents who are used to visual communication, their ToM development might not be affected.

Taken together, these outcomes suggest that young children with CI with hearing parents do not seem to differ from their peers with NH in the precursors of ToM, whilst young deaf children without CI with hearing parents lag behind their peers with NH. This difference in outcomes within the group of children with HL might be explained by the auditory input enabled by the CI. Possibly, this early auditory input strengthens the early social-emotional development of deaf children.

Present Study

Empathy is an important aspect of social-emotional development as it helps children to bond and build meaningful relationships with others. It is important to study the development of empathy at the youngest possible age, especially in children with an increased risk for developing problems in their social-emotional functioning, such as children with MHL. These children's abilities are often overestimated by their social environment, resulting in an underestimation of their need for extra support and care.

The aim of the current study was to explore affective empathy and the precursors of cognitive empathy in young children (between 29 and 32 months old) with MHL as compared to a group of children of the same age with NH. To our knowledge, empathic behavior in young children with MHL has not yet received any attention in the literature. We used parent questionnaires and structured observations to measure children's level of empathy. Previous studies on affective empathy and precursors of cognitive empathy (intention understanding) in young children with CI showed that they did not differ from hearing children (Ketelaar et al., 2012, 2013; Tasker et al., 2010). Given that this is not examined in the MHL population yet, we explored whether children with MHL performed comparable to hearing peers on affective empathy and intention understanding just like young children with CI.

In addition, the relations between affective empathic behavior and intention understanding with language ability were examined. Language is assumed to be an important medium for social-emotional learning, and the social-emotional difficulties seen in children with HL (Stevenson, 2015) might stem from the fact that they often miss parts of spoken conversations. Previous studies among children with CI found no relation between affective and cognitive empathy on the one hand and language ability on the other (Ketelaar et al., 2012, 2013). In the presented study we examined whether these findings would be similar in children with MHL.

METHOD

Participants

In total, 44 children between 29 and 32 months of age participated in this study. In the Netherlands, after detection of (moderate) hearing loss, children and their families are referred to a center for early intervention. The family-centered early intervention program offered here entails frequent house visits of early interventionists and speech and language therapists. Furthermore, parents are invited to follow various courses (e.g., sign courses, communication courses, and interactive reading courses) at the center together with other parents. Although parents are not obligated to participate in (parts of) the program, most parents are willing to participate. From the age of one and a half until the age of four years, children can participate in specialized treatment groups for children with HL twice a week. In these treatment groups, their language and social-emotional development is stimulated during (play) activities with other children with HL. The group activities are guided by one speech and language therapist and two pedagogical professionals (in most groups one of them is deaf or hard of hearing). Furthermore, the speech and language therapist conducts individual speech and language therapy sessions with the children during group time.

Since most children with MHL participate in family-centered early intervention programs we recruited participants at these centers. Twenty-three children with MHL were recruited via three different early intervention centers across the Netherlands. The control group of 21 children with NH was recruited via a well-baby clinic. Children with additional medical or developmental disabilities, such as intellectual disabilities, visual impairment, or speech-motor problems were excluded from the study. Although the sample was not matched one by one, no differences between the two groups were found regarding age, gender, and socioeconomic status (based on maternal education level) (Table 1).

All hearing children were born to hearing parents. Within the MHL sample, eight children had one parent with hearing loss (two mothers, six fathers). Seven of these parents were hard of hearing and one father was deaf. The children used spoken language in the interaction with their parents (seven parents and children supported their spoken language always or often with signs, thirteen sometimes and three never). All children with MHL were diagnosed with congenital moderate hearing losses (40-70 dB) in the better ear (residual hearing was calculated by averaging unaided hearing thresholds at 500, 1,000 and 2,000 Hz). They all wore conventional (bilateral) hearing aids and all but one child participated in an early family intervention program. A total of 72% of the children with MHL had enrolled in the early intervention program within the first six months of life. Further, 67% of the children with MHL had their first hearing aid amplification within the first six months of life.

Table 1. Demographic Profile of Participants

	MHL	NH
No. of children	23	21
Age, mean (SD) months	30.2 (0.9)	30.1 (0.5)
Age, range months	29-32	29-31
Gender, no. (%)		
Male	7 (33%)	9 (41%)
Female	16 (67%)	13 (60%)
Socioeconomic status, mean (SD)[a]	2.8 (1.0)	3.1 (1.0)
Receptive language, mean (SD)*	96.05 (15.6)	114.4 (8.4)
Expressive language, mean (SD)*	93.70 (17.0)	111.1 (10.1)
Degree of hearing loss (dB), mean (SD)	52.6 (8.2)	
No. of children with 40-60 dB HL	21	
No. of children with 61-70 dB HL	2	
Age at start family intervention, mean (SD) months	8.3 (7.9)	
Age at start family intervention, range months	1-24	
Age at amplification hearing aid, mean (SD) months	8.3 (8.3)	
Age at amplification hearing aid, range months	1-33	

Abbreviations: MHL Moderate Hearing Loss, NH no Hearing Loss, SD Standard deviation.
[a] (1=no/primary education, 2 = lower general secondary education, 3= higher general education, 4 = college / university).
*p <.001

Measures

Affective empathy observation

The Empathy Task examines children's empathic responses to emotional displays which are acted out by an experimenter (Rieffe, Ketelaar, & Wiefferink, 2010). Children watched three different emotion episodes: happiness when clicking with a pen, anger with a pen that fails to write, and pain/sadness upon hurting one's finger. Children's reactions were scored on a 20-item checklist (0 = *not at all*, 1 = *a little*, and 2 = *a lot*) for the three emotions combined (Table 2). The internal consistency was good in the present study (α=.80) and in a recent study among a sample of young children with CI (α=.85) (Ketelaar et al., 2013).

Empathy parent report

The subscale Empathy (7 items) of the Dutch version of the Infant-Toddler Social and Emotional Assessment (ITSEA) (Carter & Briggs-Gowan, 1993; Visser, Smeekens, Riksen-Walraven, & Van Bakel, 2000) was used as a parent report measure of empathy. Examples of items are "Is aware of other people's feelings" and "Is worried or upset when someone is hurt". Items were rated on a three-point scale (0 = *not true/rarely*, 1 = *somewhat true/sometimes*, and 2 = *very true/often)*. The internal consistency of the empathy subscale was good in the current study (α=.82).

Table 2. Items of the Empathy observation task (Ketelaar et al.,2013)[1]

1	Child responds to experimenter's emotion
2	Child stops playing and looks at experimenter
3	Child tries to follow what is happening
4	Child mimics experimenter's facial expression
5	Child re-enacts/imitates event
6	Child physically approaches experimenter[2]
7	Child tries to comfort experimenter[3]
8	Child tries to help experimenter

[1] Items were scored during each of the emotion episodes (happiness, anger, pain/sadness), except for item 7 and 8. [2] Assessed during pain/sadness event only. [3] Assessed during anger event only.

Intention observation

The Intention-Understanding Task (Ketelaar et al., 2012) assesses children's understanding of other people's intentions with regard to objects. Children were presented with three tasks, which all involved a final goal that the experimenter failed to achieve. For example, putting a string of beads into a cup. After three failed attempts by the experimenter, the materials were handed to the children, who could earn a maximum of three points if they completed the intended actions.

In the Imperative-Comprehension Task (Ketelaar et al., 2012), the experimenter points toward an object on the table - closer to the child than to the experimenter - and holds out her hand. Children received a score for success when they handed the object or placed it near the experimenter, or when they explicitly refused to do so. The task was administered three times, or until the children passed. Children received three points if they succeeded the first time, two points for the second time, one point for the third time and zero points when they failed all times.

In the Declarative-Comprehension Task (Ketelaar et al., 2012), the experimenter looks in surprise to a stimulus behind the child, points there simultaneously, looks at the child, and looks and points again behind the child. Children could earn three points, one for each of the following behaviors: (a) looking at the object, (b) eye contact with the experimenter after looking, and (c) smiling or vocalizing about the object.

Spoken language

Both receptive language ability and language (sentence) production were used as an indication of children's language development. Receptive language development was assessed with the Reynell Developmental Language Scales - Dutch Version (Schaerlaekens, Zink, & Van Ommeslaeghe, 1993). The sentence development scale of the Schlichting Expressive Language Test (Schlichting, van Eldik, & Lutje Spelberg, 1995) was used to measure expressive language skills. Both language tests are developed and standardized

for children between two and five years of age and have been widely used for children with and without HL. Raw scores are converted to age equivalents and language quotients. The quotient scores are normally distributed scores, with a mean score of 100 and a standard deviation of 15. These tests are part of the assessment protocol of children with MHL within the intervention programs of organizations in the Netherlands that participated in this study. The receptive language scores of two children (1 MHL and 1 NH) and the expressive language scores of four children (3 MHL and 1 NH) were missing.

Procedure

All children were tested individually in a quiet room at home, except for two children with MHL who were tested at the early intervention center. Two trained experimenters administered the empathy observation and intention observation tasks. The tasks were alternated with other tasks (not presented in this manuscript). Parents were asked to fill in questionnaires about their children's social-emotional functioning and their family's background. Additional information, such as degree of hearing loss and age at amplification was obtained from medical records. Speech and language therapists assessed the language ability of the children with MHL at 30 months of age as part of the assessment protocol of the early intervention program. The experimenters assessed the language abilities of the hearing children. The study was carried out in accordance with the standards set by the Declaration of Helsinki and informed consent was obtained for all children.

Statistical Analysis

The first research question was addressed by carrying out independent sample *t*-tests in order to compare children with MHL to hearing children on the empathy measures. Holm's sequential Bonferroni method was used to control for Type I error at the .05 level across comparisons. Effect size was estimated with Cohen's *d.* A Multivariate Analysis of Variance (MANOVA) was used to compare the levels of intention understanding between the groups, taking into account the within-subject factors. Effect size was estimated with eta squared. In case of differences between groups or tasks, post hoc t-tests were conducted. The assumptions for parametric testing were checked due to the small sample size. When the assumptions were violated, non-parametric analyses were conducted. For only one variable (intention understanding) the assumptions were not met. Yet, the outcomes of the parametric and nonparametric analyses did not show differences. For reasons of clarity, we decided to report the outcomes of the MANOVA, in line with the other variables. Correlations between the empathy measures, indices for intention understanding, degree of hearing loss and language ability were calculated using Pearson's correlations. The strength of the correlations was compared between the two groups using Fisher's r-to-z transformations and testing the z-values.

RESULTS

Language Ability

The children differed in their language ability. Children with MHL had lower receptive and expressive language abilities than the children with NH, $t(40) = -4.55$, p <.001, $d = .23$ and $t(38) = -3.92$, $p < .001$, $d = 1.244$, respectively (see Table 1).

Affective Empathy Observation and Parent Report

The results in Table 3 show that parents of children with and without MHL rated their children equally high on the empathy parent report measure. The observation measures also revealed no differences in levels of affective empathy between both groups.

Intention Observation

A 2 (Group: MHL, NH) x 3 (Task: Intention Understanding, Imperative Comprehension, Declarative Comprehension) MANOVA showed a main effect for Group, ($F(1, 40) = 16,96$, $p < .001$, $\eta^2=.29$), and for Task ($F(2, 82) = 10.17$, $p < .001$), $\eta^2=.19$) which was qualified by a Group x Task interaction, ($F(2, 82) = 3.76$, $p = .027$, $\eta^2=.08$). Post-hoc *t*-tests showed that children with MHL scored lower on the Intention Understanding and Declarative Comprehension tasks than the children with NH, but not on the Imperative Comprehension task (Table 3). Post-hoc *t*-tests were conducted to examine the different types of child behavior (looking at the object, eye contact with the experimenter after looking, and smiling or vocalizing about the object) on the Declarative Comprehension task in more detail. The results indicated that the difference was largely attributable to the children with MHL less frequently engaging in eye contact and smiling or vocalizing about the object to the experimenter.

Table 3. Mean Scores on Empathy Parent Report, Empathy observation, and Intention Observation as a Function of Group by Task

	No. of items	Range	Mean scores (SD)		*t*	*p*	*d*
			MHL	NH			
			n = 19	n = 17			
Empathy parent report	7	0-2	1.23 (0.5)	1.41 (0.4)	-1.21	.235	.04
Empathy observation			n = 23	n = 21			
Empathy observation	20	0-2	0.82 (0.3)	0.96 (0.2)	-1.90	.064	.06
Intention observation							
Intention understanding	3	0-3	1.65 (1.1)	2.48 (0.6)	-3.11	.003	.94
Imperative comprehension	1	0-3	2.74 (0.9)	2.81 (0.7)	-0.30	.767	.09
Declarative understanding	1	0-3	1.83 (0.7)	2.70 (0.7)	-4.65	.000	1.24

Abbreviations: MHL Moderate Hearing Loss, NH no Hearing Loss

Parents with Hearing Loss and the Use of Signs

Since eight parents of the children with MHL had a hearing loss themselves, this might have affected the results. Therefore, we repeated all analyses again with the exclusion of these parents. All results remained the same. Further, we also divided the children with MHL in a group with and a group without parents with HL and compared their performance. No differences were found between the children with and without a parent with HL.

Parents reported that they used spoken language in the interaction with their child, and seven parent-child dyads supported their language with signs. We examined whether the use of signs affected the results and divided the group children with MHL in a group that often used signs and a group that sometimes or never used signs. We found no differences between these two groups on the empathy measures. Interestingly, only one of the seven parent-child dyads that often used signs included a parent with HL. The other parents with HL reported that they sometimes or never used signs to support their spoken language.

Relations Between Empathy Measures and Child Characteristics

Pearson's correlation coefficients between the different empathy measures, language ability, and the degree of HL are presented in Table 4. We found no significant differences in the strength of the correlations between the two groups, therefore we collapsed the data of both groups. Receptive and expressive language scores were positively related to each other. No other significant correlations were found between variables.

Table 4. Pearson's correlation coefficients of Empathy, Intention and Language measures

		1	2	3	4	5	6	7	8
1	Degree of hearing loss[a]		.00	-.32	-.02	-.19	.24	.10	.16
2	Receptive language			.69*	.16	.13	.29	-.00	.22
3	Expressive language				.12	.22	.29	-.01	.15
4	Empathy parent report					.13	.07	.14	.24
5	Empathy observation						.28	.23	.29
6	Intention understanding							-.02	.26
7	Imperative comprehension								.18
8	Declarative comprehension								

[a] only available for the children with MHL. * p <.001

DISCUSSION

Can we assume that toddlers with MHL care just as much about other people's feelings as their peers with NH? The main aim of the present study was to explore empathy levels in young children with and without MHL. We focused on affective empathy and the precursors of cognitive empathy. Furthermore, we examined whether these empathic abilities were associated with children's language ability.

In line with findings of research conducted among young children with CI (Ketelaar et al., 2013), young children with MHL in this study showed equal levels of affective empathy compared to peers with NH. Trained experimenters as well as parents reported that children with MHL were just as affected by seeing another person in distress as children with NH. These findings are in line with the view that affective empathy is an innate capacity (Hoffman, 1990), enabling children with MHL to feel what the other person is feeling to the same extent as hearing peers.

Turning our attention to the precursors of cognitive empathy, the picture was less clear. In contrast to research among young children with CI (Ketelaar et al., 2012), children with MHL differed from their peers with NH in some aspects of joint attention. When children were given an explicit non-verbal command in the Imperative Comprehension task (i.e., the experimenter pointed toward an object and held out her hand), joint attention was established in almost all children at the first attempt. However, when the experimenter tried to share her interest for an object in the Declarative Comprehension task, children with MHL responded differently from their peers with NH. Although children in both groups equally often turned their head in the direction of the object the experimenter was pointing at, children with NH more often followed through by turning back to the experimenter and making eye contact, vocalizing and/or smiling. When we combine the outcomes of these two joint attention tasks, it seems that both groups of children understood the pointing gesture equally well but that the children with MHL less often engaged in a communicative exchange with the experimenter.

Additionally, children with MHL less often completed the experimenter's intended actions, indicating a limited understanding of intentions compared to hearing children. This seems to be at odds with their performance on the joint attention tasks, where they understood quite well that the experimenter's hand gesture was meant to direct their attention to something. Possibly, the intentions behind the hand gestures in the joint attention tasks were of a much more explicit nature than the intentions shared during the experimenter's failed attempt to complete an action. Parents of children with HL are known to be more directive in the interaction with their child than parents of hearing children (Pressman, Pipp-Siegel, Yoshinaga-Itano, & Deas, 1999). Consequently, children with MHL might be more used to direct communication than hearing children and therefore less able to understand indirect communication.

In a recent study, Peterson (2015) recommended using direct behavioral observation of affective empathy in young deaf children. She argued that questionnaires might be limited in capturing the subjective experience of empathy in young children with HL whose ability to express their emotions verbally might be limited. Therefore, in the present study, observation measures (for affective empathy and intention understanding) in combination with a parent questionnaire were used to examine empathy as to increase the validity of the study. The observation instrument of affective empathy measured a child's response

to an unfamiliar person judged by the experimenter while the questionnaire measured children's empathic responses to other children and familiar persons as reported by the parent. Yet, both instruments revealed equal levels of empathy in children with and without MHL. Intention understanding was only reflected by measures of observation. Future studies might include a questionnaire next to observations.

Even though the children with MHL in this study had lower levels of receptive and expressive language skills than the children with NH, this did not affect their ability for empathy. In line with research among children with CI (Ketelaar et al., 2012, 2013), we found no relation between language ability and empathy measures in either group. It seems that adequate empathic responding in toddlers and preschoolers (with or without HL) does not require high levels of language proficiency. However, the demands that are placed on children's language capacities could become more prominent with age. Indeed, relationships between language and empathy (Netten et al., 2015), or between language and other aspects of social-emotional functioning (Stevenson, 2010; Theunissen et al., 2015) have been reported in studies among older children with HL.

Although children with MHL were on par with their peers with NH on the affective aspect of empathy, they were behind on some precursors of cognitive empathy. An important question that arises based on these outcomes is why children with MHL were less able than their hearing counterparts to understand the intentions of others and why they engaged less in communicative exchanges. Earlier studies indicated that deaf children with hearing parents showed lower levels of joint attention than hearing children (Cejas, Barker, Quittner, & Niparko, 2014; Prezbindowski, Adamson, & Lederberg, 1998; Tasker et al., 2010). However, no differences in joint attention were found in deaf children of deaf parents and in children with CI (Ketelaar et al., 2012; Spencer, 2000; Tasker et al., 2010). Access to visual and auditory information is important to develop the capacity for joint attention. Deaf parents use more visual-tactile attention strategies during interaction with their deaf child than hearing parents (Spencer, 2000), which might lead to longer episodes of joint attention. In addition, access to social information (e.g., during conversations) provided by deaf parents enhances deaf children's social-emotional-development (Peterson, 2015). Studies examining false belief understanding in deaf children with deaf parents showed no delay in this aspect of ToM (Peterson, Wellman, & Liu, 2005; Schick, Villiers, Villiers, & Hoffmeister, 2007).

Despite the inclusion of eight parents with HL in our MHL sample, we did not find an effect of parental hearing status. The children with MHL who had parents with HL performed comparable on joint attention measures to the children with MHL who had hearing parents. The parents with HL in our sample were hard of hearing (with the exception of one deaf parent). It might be that these parents did not grow up with visual communication strategies and the use of signs like deaf parents. Only one parent with HL reported to often use signs in the interaction with his child.

Previous studies demonstrated that deaf children with CI achieved comparable levels of joint attention as hearing children (Ketelaar et al., 2012; Tasker et al., 2010). We might expected the same outcome for the children with MHL, who have more auditory access than deaf children without CI. Yet, this was not confirmed, which raises the question why this would be different for children with MHL? Possibly, children with CI are more focused on visual cues than children with MHL. All children with CI experienced a period of severely limited or even non-existent access to sounds before implantation. During this period, they were highly dependent on visual cues in the communication and they may have continued to use this source of information after implantation. Since children with MHL hear sounds and voices, they might feel less inclined to focus on visual cues. In addition, intervention programs for children with CI in the Netherlands are much more extensive than intervention programs for children with MHL. After implantation, children with CI temporarily participate in rehabilitation programs of CI centers, in addition to the early family-centered intervention program. Possibly, parents of children with CI are more trained in attracting a child's attention and achieving joint attention in order to facilitate communication. As a consequence, intervention programs for children with CI and their parents might also have a beneficial effect on these children's social-emotional development.

Taken together, children with MHL may be more at risk for difficulties in their empathy development than hearing children. Although affective empathy seems to develop well, early signs of impairments in cognitive empathy are already observable in toddlerhood. Based on findings from studies among children with varying degrees of HL and given the growing importance of language for social-emotional development (Netten et al., 2015; Theunissen et al., 2015), we can tentatively assume that children with MHL will encounter difficulties in developing cognitive empathy as they grow up. This in turn may seriously impair their social functioning. To be able to play with peers, children need to share and understand the emotions, intentions, and beliefs of their peers (Brownell, Zerwas, & Balaram, 2002). Lower levels of empathic behavior may result in difficulties socializing with peers (Rieffe et al., 2015). Furthermore, when children with MHL are not very focused on others' behavior they might have fewer opportunities to learn from others. Social experiences, e.g. reflecting upon one's own behavior towards others, as well as evaluating others' behaviors are crucial to fully develop social competence (Rieffe & Camodeca, 2016).

Limitations and Future Directions

Due to a relatively small sample size, the results of our study should be interpreted with caution. We welcome other researchers to replicate this study with larger sample sizes. The strength of this study lies in the fact that it has been conducted in a well-defined group of young children with MHL within a small age range. The results emphasize the importance of more research among this group of children; with children of different ages, but also across the range of social-emotional domains. However, this study was cross-sectional in nature, preventing us from drawing conclusions about causal relations.

Future studies might adopt a longitudinal design to examine whether the performance of children with MHL on the precursor tasks indeed is predictive of later impairments in cognitive empathy. Also of interest is whether children with MHL will eventually catch up to their hearing peers or whether this gap in empathic behavior will continue to grow as children get older.

In the present study, we did not discriminate between visual and auditory cues of empathy. Both visual cues (facial emotion expression) and auditory nonverbal cues (emotional prosody) are assumed to be important in the development of empathy (Most & Michaelis, 2012). Children with MHL between four and six years of age do not seem to have difficulties in the auditory perception of emotions compared to their hearing peers (Most & Michaelis, 2012). The researchers assumed that children with MHL have sufficient residual hearing in the low frequency range to perceive emotions in voices. Since the young children with MHL in our study performed more poorly on non-verbal empathy measures, future research with young children might take different modalities of empathy into account.

A total of seven parents in this study were hard of hearing. We do not know whether these parents had a HL from childhood or if it was a result of ageing. For future studies, it is important to take this information into account. When parents are born with HL they might have an innate understanding of how to structure communication situations and they have their own growing up experiences that might be relevant in supporting their child's social-emotional development.

The empathy observation tasks in the present study could be of interest for clinical purposes to gain more insight in the social-emotional development of children with HL in real life settings. Therefore, it is advisable to standardize these tasks for hearing children and children with HL. When data is obtained from larger samples, norm scores could be computed and provided for professionals working with these children and for diagnostic purposes.

Conclusions and Implications

Research among children with MHL is still very sparse. Most research in this population has concerned language outcomes, showing that these children are at risk for language difficulties (Moeller & Tomblin, 2015; Tomblin et al., 2015). The current study indicates that these children are also at risk for social-emotional difficulties. Although the young children with MHL in this study were affected by other people's emotions to the same extent as hearing children, they were less able to read other people's intentions, potentially impairing their ability to respond appropriately in social interactions.

In early intervention programs, explicit attention needs to be given to the social-emotional development of children with MHL, and in particular to parental training of various

empathy-related skills. Parents are a child's first teacher and they have the best motivation to stimulate their child's development. Parental use of mental state talk in daily conversation is one way to promote perspective-taking abilities in children with HL (Moeller & Schick, 2006; Morgan et al., 2014). Talking about emotions, cognitive processes and other people's desires and beliefs during daily routines can enhance social-emotional development. Furthermore, explicitly labeling the emotional states of others will increase a child's understanding of others' behavior.

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